US-PAT-NO: **6261322**

DOCUMENT-IDENTIFIER: US 6261322 B1

TITLE: Implant with composite coating

---------- KWIC ---------

US Patent No. - PN (1):
6261322

Detailed Description Text - DETX (14):

Referring now to FIG. 4, a porous structured surface 410 with a coating 420 is depicted. The coating 420 includes titanium and can be deposited via physical vapor deposition with a gas, preferably an inert gas, such as, for example, argon and/or helium. It can be advantageous to use argon as the gas because it is inert and has a relatively high atomic weight. Significantly, the coating 420 covers portions of a structured surface defined by an interconnected pore 430 that is hidden from **line**-of-**sight** deposition (i.e., the pore 430 cannot be seen from the point of view of the deposition source). The structured surface is also defined by a plurality of particles covering a substrate 440 (i.e., the structured surface is defined by the interface between the substrate 440 and the plurality of particles). Nevertheless, the surface defined by the interconnected pore 430 is coated and provides an area for tissue in-growth and/or on-growth because an inert gas is present in the deposition chamber while the coating 420 is being applied. Although the preferred embodiment shown in FIG. 4 includes the coating of the surface

defined by the interconnected pore 430, it is within the level of ordinary skill in the art after having knowledge of the invention disclosed herein to coat any undercut, or vertical, or **line**-of-**sight** hidden surface area.

Detailed Description Text - DETX (15):

FIG. 4 demonstrates substantially improved results that are unexpected. Specifically, the coating of internal pores demonstrates the significant unexpected advantageous result that when an inert gas is present during the deposition process, the coating is deposited on **line**-of-**sight** hidden surfaces (e.g. interconnected pores). It can be appreciated that the structured surface 410 is coated because the exterior of the particles appears rough. Normally, in the case of an uncoated particle, the perimeter would be smooth and more nearly circular. The roughness is the coating. This result is advantageous because it significantly improves adhesion of the surrounding tissue to the implant. Adhesion is significantly improved because tissue on-growth and/or in-growth can take place on undercuts, crevices, cul de sacs, conduits, caves, tunnels, and interconnected pores that are hidden from **line**-of-**sight** deposition, thereby significantly improving the strength of the connection between the surrounding tissue and the implant. The strength of the connection is significantly improved because the tissue grows into the undercuts, crevices, cul de sacs, conduits, caves, tunnels, and interconnected pores creating a tissue structure that interlocks with the structured surface on a macroscopic level. It can be advantageous if the coating covers a continuous length of a void structure (e.g., undercuts, crevices, cul de sacs, conduits, caves, tunnels, interconnected pores, etc.) that is open to

adjacent tissue in at least two places. For example, if the tissue grows through a tunnel, the strength of the connection will be based not only on the interface adhesion between the wall of the tunnel and the tissue, but also on the inherent mechanical strength of the loop of tissue that is routed through the tunnel.

Detailed Description Text - DETX (18):
Still referring to FIG. 5, the substrate 570 includes a structured surface (not shown) onto which the coating can be deposited. Portions of the substrate that are not to be coated can be masked with a mask material that can be removed after the deposition of the coating is finished. In general, the coating can be formed by any **thin film** technique. **Thin film** technique include physical vapor deposition and chemical vapor deposition, and combinations thereof.

Claims Text - CLTX (9):
4. The implant of claim 1, wherein said coating is formed by a **thin film** technique.

Claims Text - CLTX (10):
5. The implant of claim 4, wherein said **thin film** technique includes at least one deposition process selected from the group consisting of physical vapor deposition and chemical vapor deposition.

Claims Text - CLTX (27):
18. The composition of claim 13, wherein said coating is formed by a **thin film** technique.

Claims Text - CLTX (28):

19. The composition of claim 18, wherein said **thin film** technique includes at least one deposition process selected from the group consisting of physical vapor deposition and chemical vapor deposition.

Claims Text - CLTX (46):

30. The implant of claim 25, wherein said coating is formed by a **thin film** technique.

Claims Text - CLTX (47):

31. The implant of claim 30, wherein said **thin film** technique includes at least one deposition process selected from the group consisting of physical vapor deposition and chemical vapor deposition.